Function
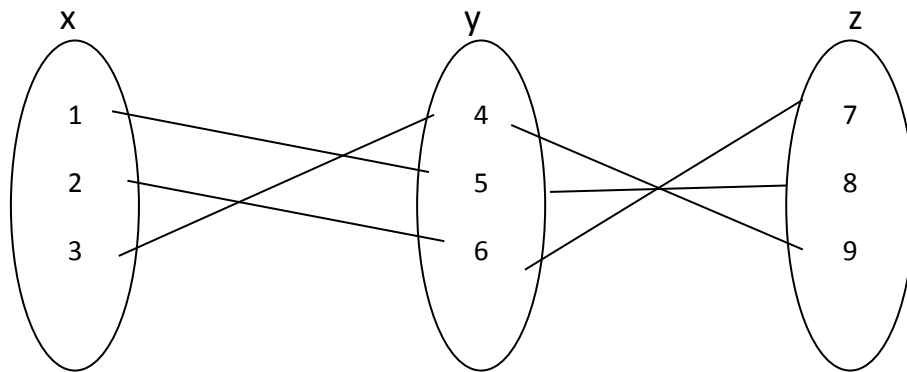
1. The function f is defined by $f: x \rightarrow 2x - 3$, xϵR

    a. Find f(3) an f(-3)

    b. Find x for which f(x) =7

    c. Sketch graph of f

    d. State the domain and find the range of f

2. Find the domain and range of the following functions

    a. $f(x) = \sqrt{x}$

    b. $g(x) = \sqrt{9 - x^2}$

    c. $f(x) = \frac{1}{x}$

    d. $g(x) = \frac{1}{x-4} + 5$

3. The function f is $f: x \rightarrow ax^2 + bx - 5$, x$\epsilon$R. If f(-1) =1 and f(1)=-8,

    a. find the values of a and b

    b. the values of x for which f(x)=-5

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4. The following arrow diagram shows the function g that maps set X to set Y and the function f maps set Y and set Z

   a. Find $f \circ g(1), f \circ g(2)$ and $f \circ g(3)$

   b. State the domain and range of the function f,g and $f \circ g$

5. The function f and g are defined as $f: x \rightarrow 2x + 5$, $g: x \rightarrow 4x - 3$

   a. Find the composite function $f \circ g$ and its domain

   b. Find the composite function $g \circ f$ and its domain

   c. Find f[g(3)]

6. $g(x) = x^2 - 3, g[h(x)] = x^2 - 4x + 1$. Find an expression for h(x)

7. Given $g(x) = mx + n$ and $g^3(x) = 27x + 13$ where m and n are constants. Find values of m and n

8. The functions f and g are defined by

   $f: x \to \sqrt{1 - x^2}, -1 \leq x \leq 1$

   $g: x \to x^2 + 2, x \epsilon R$, Express the composite function $g \circ f$

9. Function f with real values is defined by $f: x \to \sqrt{|x| - 2}$. Find the domain and range of f

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10. Determine whether each of the following function is one-to-one

    a. $f(x) = x^3$
    b. $g(x) = \sqrt{x}$
    c. $h(x) = 5 - x^2$
    d. $f(x) = 2x - 5$
    e. $g(x) = 5$
    f. $p(x) = \dfrac{1}{x}$

11. If f(-1)=-8, f(0)=-5 and f(2)=1 , find f^{-1}(-8), f^{-1}(-5) and f^{-1}(1)

12. Use the properties of inverse functions to show that f and g are inverses of each other.

    a. $f(x) = x - 3, g(x) = x + 3$
    b. $f(x) = 5x, g(x) = \dfrac{x}{5}$
    c. $f(x) = x^3, g(x) = x^{\frac{1}{3}}$
    d. $f(x) = \dfrac{2-x}{7}, g(x) = 2 - 7x$
    e. $f(x) = \dfrac{1}{x}, g(x) = \dfrac{1}{x}$
    f. $f(x) = x^2 - 1, x \geq 0; g(x) = \sqrt{x+1}, x \geq -1$

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13. A function is defined as $f: x \rightarrow 4x - 3, x \epsilon R$
    a. Find the inverse function f^{-1} in similar form
    b. Verity your answer by showing that $f[f^{-1}(x)]=x=f^{-1}[f(x)]$
    c. Sketch the graph of f, f^{-1} and y=x on the same coordinate axes.

14. Given the function $f(x) = \sqrt{4 - x}$
    a. Find the domain and range of the function f
    b. Determine whether f^{-1} exists. If it exists, find its expression, domain and range.
    Hence, sketch the graph of f^{-1} by using the graph of f, and y=x

15. Given that the function $f(x) = \frac{x+1}{x-2}, x \neq 2$ is one -to -one.
    a. Find $f^{-1}(x)$
    b. Find the range of f

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16. The function f and the inverse function of f are defined $f: x \rightarrow px + q$, xϵR ;
$f^{-1}: x \rightarrow 6x + 7$. Find the values of p and q

17. Find the inverse of the function $g(x) = x^2 - 1, x \geq 0$. Find the domain and range
for this inverse function. Hence, sketch the graphs of g, g^{-1} and y=x

18. Function f is defined by $f: x \rightarrow 3 + (x - 2)^2$, x$\epsilon$R
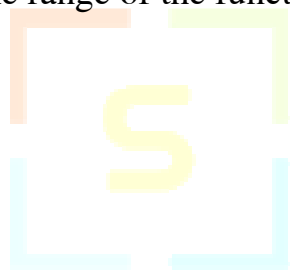   a. Sketch the graph of f
   b. State the range of f

19. Sketch the graph and state the range for each of the following functions

    a. $f: x \rightarrow 2x - 6, x\epsilon R, 0 \leq x \leq 4$

    b. $g: x \rightarrow x^2 - 2x + 2, x\epsilon R$

20. Sketch the graph and state the range of the function $h: x \rightarrow x^2 + 2, x\epsilon R$

21. Sketch the graph for each of the following functions

    a. $f(x) = 3x^2 - 2x - 1$

    b. $g(x) = \sqrt{x - 2}$

    c. $h(x) = |x - 1|$ Hence, find its domain and range.

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22. The function f is defined by $f(x) = \begin{cases} 2x, x > 0 \\ x^2, x \leq 0 \end{cases}$

    a. Find f(2) and f(-2)

    b. Find x for which f(x)=16

    c. Sketch the graph of f

    d. State the domain and find the range of f

23. Sketch the graph of the function $f: x \rightarrow |x + 1|$, $x \epsilon R$. With the aid of the graph of f, sketch the graphs of the following functions

    a. 2f(x)

    b. f(x+2)

    c. f(x)-2

    d. f(2x)

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